Sierra Video Systems

ADM-188

AES Audio Delay

Owner's Manual

sierravideo
A KRAMER ELECTRONICS COMPANY

openGear

ADM-188-OM
Version: 2.2

ADM-188 • AES Audio Delay Owner's Manual

- Sierra Part Number: **ADM-188-OM**
- Document Version: **2.2**
- Printed in the United States.
- Last Author: SJK
- Printing Date: 11/29/2010 9:35:00 AM

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Important Regulatory and Safety Notices

Before using this product and any associated equipment, refer to the "Important Safety Instructions" listed below so as to avoid personnel injury and to prevent product damage.

Products may require specific equipment, and /or installation procedures be carried out to satisfy certain regulatory compliance requirements. Notices have been included in this publication to call attention to these specific requirements.

Symbol Meanings

This symbol on the equipment refers you to important operating and maintenance (servicing) instructions within the Product Manual Documentation. Failure to heed this information may present a major risk of damage or injury to persons or equipment.

Warning

The symbol with the word **"Warning"** within the equipment manual indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury.

Caution

The symbol with the word "**Caution**" within the equipment manual indicates a potentially hazardous situation, which if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Notice

The symbol with the word "**Notice**" within the equipment manual indicates a situation, which if not avoided, may result in major or minor equipment damage or a situation which could place the equipment in a non-compliant operating state.

ESD Susceptibility

This symbol is used to alert the user that an electrical or electronic device or assembly is susceptible to damage from an ESD event.

Important Safety Instructions

Caution

This product is intended to be a component product of the openGear™ frame. Refer to the openGear™ frame Owner's Manual for important safety instructions regarding the proper installation and safe operation of the frame as well as it's component products.

Warning

Certain parts of this equipment namely the power supply area still present a safety hazard, with the power switch in the OFF position. To avoid electrical shock, disconnect all A/C power cords from the chassis' rear appliance connectors before servicing this area.

Warning

Service barriers within this product are intended to protect the operator and service personnel from hazardous voltages. For continued safety, replace all barriers after any servicing.

This product contains safety critical parts, which if incorrectly replaced may present a risk of fire or electrical shock. Components contained within the product's power supplies and power supply area, are not intended to be customer serviced and should be returned to the factory for repair.

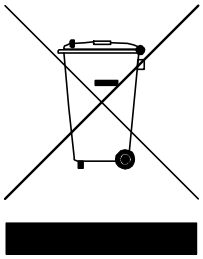
To reduce the risk of fire, replacement fuses must be the same type and rating.

Only use attachments/accessories specified by the manufacturer.

Environmental Information

The equipment that you purchased required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

To avoid the potential release of those substances into the environment and to diminish the need for the extraction of natural resources, Sierra Video Systems encourages you to use the appropriate take-back systems. These systems will reuse or recycle most of the materials from your end-of-life equipment in an environmentally friendly and health conscious manner.
The crossed-out wheeled bin symbol invites you to use these systems.



If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.
You can also contact Sierra Video Systems for more information on the environmental performances of our products.

openGear Contents

Introduction 6

In This Chapter 6
A Word of Thanks 6
Overview 6
Supported Audio Formats 7
Discrete AES Audio Input 7
Discrete AES Audio Output 7
Inputs and Outputs 7
Signal Timing 7
Functional Block Diagram 8
Documentation Terms 8

Installation and Setup 9

In This Chapter 9
Static Discharge 9
Unpacking 9
Rear Module Installation (Optional) 10
Rear Modules Available for ADM-188 11
Board Installation 12
Card Control and Status 13
Card Status 13
Menu Navigation 13
Factory Default Settings 15

Remote Control 16

In This Chapter 16
DashBoard Control System Software 16

Technical Specifications 18

Service Information 19

In This Chapter 19
Troubleshooting Checklist 19
Warranty and Repair Policy ..... **Error! Bookmark not defined.**20

Ordering Information 20

ADM-188 and Related Products 22

Contact Us 23

Contact Sierra Video Systems 23
Visit us at the Sierra Video Systems website. 23

Introduction

In This Chapter

This chapter includes the following sections:

- A Word of Thanks
- Overview
- Functional Block Diagram
- Features
- Documentation Terms

A Word of Thanks

Congratulations on choosing the openGear™ **ADM-188 AES Audio Delay**. The ADM-188 is part of a full line of modular conversion gear for broadcast TV environments. The Sierra Video Systems openGear™ line includes video decoders and encoders, audio embeders and de-embeders, distribution amplifiers, format converters, and much more. Sierra openGear™ modular conversion gear will meet your signal conversion needs now and well into the future.

Should you have questions pertaining to the installation or operation of your ADM-188, please contact us at the numbers listed on the back cover of this manual. We are happy to help with any questions regarding this or any other openGear™ card.

Overview

The ADM-188 is a high quality AES audio delay capable of delaying up to 8 AES channel pairs. The delay range spans from as little as 8.3 ms to as much as 5.461 seconds. All input AES signals are sample rate converted to match a common output timing. The output timing can be locked to the AES input timing, or a black burst or tri-level video reference signal.

Beyond audio delay, the ADM-188 can also provide AES audio routing. On the input side of the router are the up to 16 channels (8 pairs) of discrete AES input. On the output side are the up to 16 channels (8 pairs) of discrete AES output. The router acts as a full audio cross point: each of the 16 output channels can receive signal from any one of the 16 input channels. Output channels can also be mapped to a “silence” source. Each output allows independent gain adjustment and optional polarity inversion.

All card configuration is done with a simple front panel menu. There is a four character text display to view and control parameters, and a toggle switch and two buttons to navigate the menu.

Supported Audio Formats

Discrete AES Audio Input

The ADM-188 can accept 16 channels (8 pairs) of discrete AES audio on 75 ohm BNC connections. The AES must have a nominal rate of approximately 48 kHz. Sample rate conversion is employed to account for minor clock rate differences in the AES stream and the input video stream. However, the card does not support AES input at 32 kHz, 44.1 kHz, 96 kHz or 192 kHz rates.

Discrete AES Audio Output

The ADM-188 can emit 16 channels (8 pairs) of discrete AES audio on 75 ohm BNC connections. The output clock rate of each pair is precisely locked, and derived from the input AES, or the frame reference.

Inputs and Outputs

The input and outputs of the ADM-188 are the following:

Inputs:

- 4 dedicated AES input connections (AES input 5-6)

Switchable Input/Outputs:

- 4 AES connections, switchable between input and output (AES input/output 1-4)

Outputs:

- 8 dedicated AES output connections. (AES output 1-8)

Signal Timing

The input AES audio rate must be 48 kHz (± 1%) nominally. There are sample rate converters on each input that allow the use of asynchronous sources, but the rate must be 48kHz. The output clock rate will be 48 kHz as defined by the AES input, or the frame video reference, depending on user selection.

In the case where AES input is the reference, the timing will be taken from the lowest numbered AES input BNC. If you have connections to AES inputs 3, 5, and 8, AES input 3 will be the timing master and AES 5 and 8 will be re-sampled accordingly. Consequently, to slave the output timing to a DARS audio reference, simply connect it to AES input 1 and all other inputs will be re-sampled to match that channel.

To match the output audio clock to a video reference, select the frame reference (“Reference 1” or “Reference 2”). The card will automatically detect any black burst or tri level format (NTSC, PAL, 1080i, 720p) and generate a 48 kHz output clock accordingly.

Functional Block Diagram

This section describes the basic operation of your ADM-188 product.

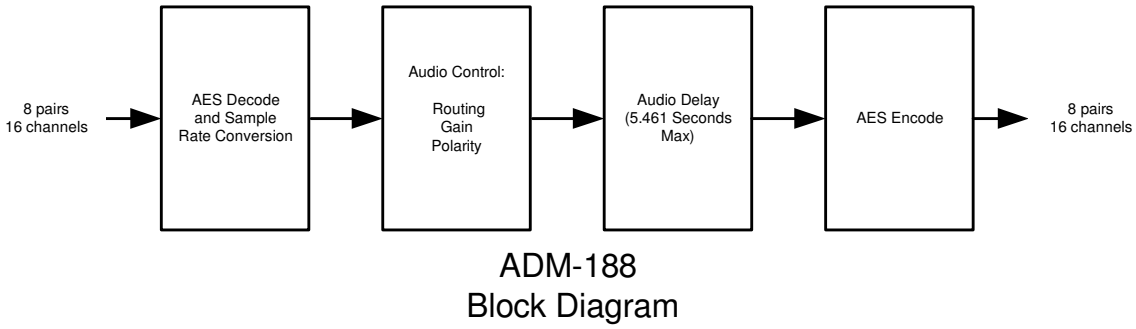


Figure 1. Simplified Block Diagram of ADM-188 Functions

AES signals are received on the input BNCs. AES audio is sample rate converted to match the selected clock source. AES routing, gain, and polarity are then applied. The signals are then stored in memory, providing an audio delay of up to 5.461 milliseconds.

Documentation Terms

The following terms are used throughout this guide:

- "**Frame**" refers to the **8310** frame that houses the **ADM-188** card.
- "**Operator**" and "**User**" both refer to the person who uses the **ADM-188**.
- "**Board**" and "**Card**" all refer to the **ADM-188** card itself, including all components and switches.
- "**System**" and "**Video system**" refers to the mix of interconnected production and terminal equipment in which the **ADM-188** operates.

Installation and Setup

In This Chapter

This chapter includes the following sections:

- Static Discharge
- Unpacking
- Rear Module Installation (Optional)
- Board Installation
- Card Control and Settings
- Factory Default Settings

Static Discharge

Whenever handling the card and other related equipment, please observe all static discharge precautions as described in the following note:

ESD Susceptibility

Static discharge can cause serious damage to sensitive semiconductor devices. Avoid handling circuit boards in high static environments such as carpeted areas, and when wearing synthetic fiber clothing. Always exercise proper grounding precautions when working on circuit boards and related equipment.

Unpacking

Unpack each card you received from the shipping container, and check the contents against the packing list to ensure that all items are included. If any items are missing or damaged, contact your sales representative or Sierra Video Systems directly.

Rear Module Installation (Optional)

If you are installing the card in a 8310-C-BNC or 8310-BNC frame (one with a 100 BNC rear module installed across the entire back plane), skip this section.

If you are installing the card into a slot with no rear module, you should have ordered and received one of the following modules; RM-ADM-188-B or RM-ADM-188-C. You will need to install it in your 8310 frame before you can connect cables.

Use the following steps to install a rear module in an 8310 openGear™ frame:

1. Refer to the openGear™ 8310 frame Owner's Manual, to ensure that the frame is properly installed according to instructions.
2. On the rear of the 8310, locate the card frame slot.
3. As shown in Figure 2, seat the bottom of the rear module in the seating slot at the base of the frame's back plane.

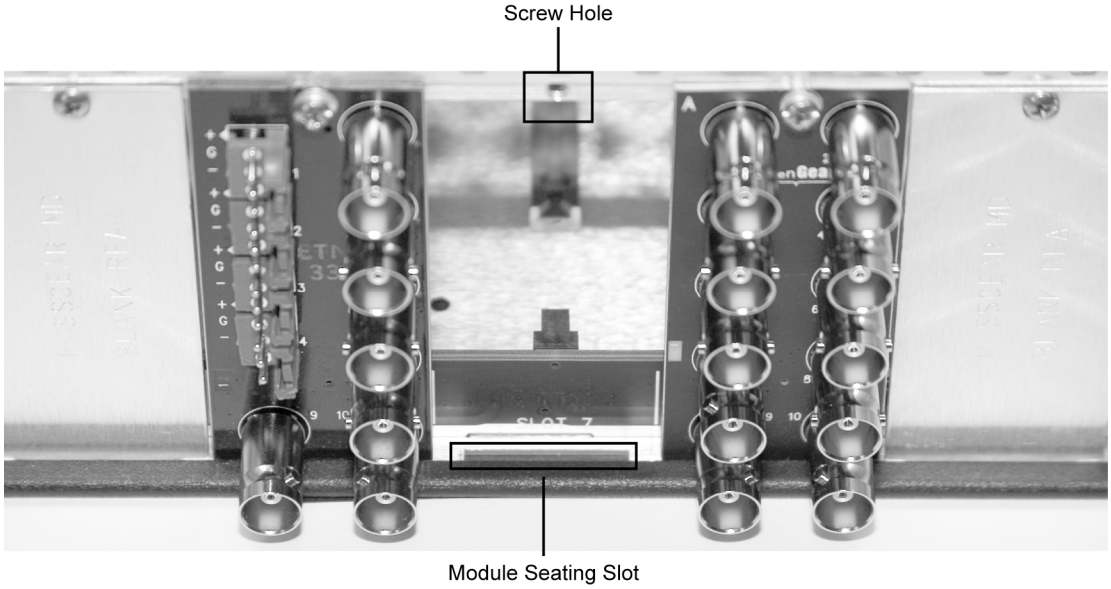


Figure 2. Rear Module Installation

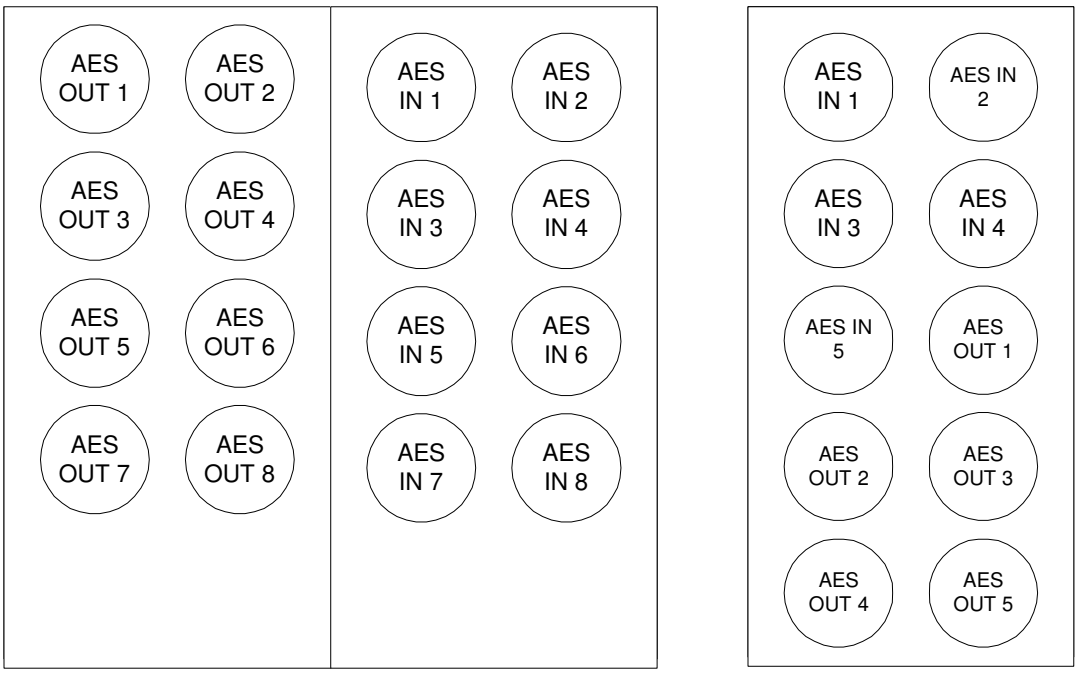
4. Align the top hole of the RM-ADM-188-C with the screw hole on the top edge of the 8310 back plane.
5. Using a Phillips driver and the supplied screw, fasten the rear module to the 8310 back plane. Do not over tighten.

All modules are installed using the same method above.

The following section contains a table of the optional rear modules available for the ADM-188.

Rear Modules Available for ADM-188

Figure 3. BNC Designations for the Card Rear Modules available for the ADM-188.



RM-ADM-188-B **RM-ADM-188-C**

Board Installation

Use the following steps to install the card in the openGear™ 8310 frame:

1. Refer to the Owner's Manual of the openGear™ 8310 frame to ensure that the frame is properly installed according to instructions.

Warning

Heat and power distribution requirements within a frame may dictate specific slot placement of cards. Cards with many heat-producing components should be arranged to avoid areas of excess heat build-up, particularly in frames using convection cooling.

2. After selecting the desired frame installation slot, hold the card by the edges and carefully align the card edges with the slots in the frame. Then, fully insert the card into the frame until the rear connection plugs are properly seated on the midplane and rear modules.

This completes the procedure for installing the card in the openGear™ 8310 frame.

Card Control and Status

Card Status

The card indicates the status of the input signal with the four blue LEDs labled with the different supported formats (1080, 720, 625, 525), these LEDs correspond to AES Inputs 1-4. The four orange LEDs labeled User 1-4 correspond to AES Inputs 5-8 respectively. When the card has locked to an AES signal, a corresponding LED will be illuminated. When the card has not locked to an AES signal, the card will search for a signal and the lights will cycle rapidly.

Menu Navigation

The card can be configured from a menu system built in to the front card edge. This provides an intuitive and easy to use method for exploring and using the features of the card.

The menu is navigated by using the toggle switch and the two push buttons. The lower button is the "Enter" button to enter a submenu, and the upper button is the "Exit" button to exit a submenu. Moving the toggle switch up or down moves up or down in menu choices, and pressing the buttons moves in or out of sub menus.

The menu LEDs will illuminate from top to bottom to indicate increasing depth in the menu.

Audio Submenu

Menu Structure				**Parameter Type**
Aud	AES	Ch01-Ch16 **(x16)**	Src	Output Source
			Gain	Output Gain
			Pol	Output Polarity
	Tone	TG1-TG4 **(x4)**		Tone Frequency

Output Source

Because the cards audio system functions like a router, each output can be sourced from any input channel. This parameter lets you choose from the many different sources. Here is an explanation of the different source names:

Source Name	**Description**
AeXX	Discrete AES channel XX (1 through 16)
TgX	Test Generator channel X (1 through 4)

Output Gain

The gain of each output is adjustable from +30 dB to –100 dB in 0.1 dB steps. After –100 dB gain is set to –Inf, which means that output is present, but muted.

Output Polarity

If set to "Norm" output polarity is the same as input polarity, if set to "Inv" the output polarity is inverted. This can be used to correct polarity errors in the input signals fed to the card.

Tone Frequency

This sets the frequency of the test tone for each of the four tone generators. Each of the four tone generators TG1 – TG4 can be set to a different frequency, and are available as audio sources for the embedded or AES audio outputs. The tones can range from 50Hz to 16kHz.

Display Submenu

Menu Structure		Parameter Type
Disp	H/V	Display Orientation
	BRGT	Display Brightness

Display Orientation

This parameter lets you change the orientation of the display. “Vert” makes the characters look correct when the cards are mounted in a 2 RU frame like the 8310. “Horz” makes the characters look right in a horizontal frame.

Display Brightness

This parameter allows you to set the standard output brightness of the menu display. It is a percentage of maximum brightness.

Preset Submenu

Menu Structure		Parameter Type
Prst	Slct	Select Preset
	Save	Save Settings
	Load	Load Settings
	Fact	Restore Factory Settings

Select Preset

Select from one of the five saved presets.

Save Settings

In this parameter, move the toggle switch up to save the settings to the card persistent storage.

Load Settings

In this parameter, move the toggle switch up to load the saved settings and make them active.

Restore Factory Settings

In this parameter, move the toggle switch up to make the factory default settings active, and make the stored settings equal to the factory settings.

Information Submenu

Menu Structure		Parameter Type
Info	+POW	Positive Watts Consumed
	-POW	Negative Watts Consumed
	SWR#	Software Release Number

	SWB#	Software Build Number

Positive Watts Consumed

A read only indication of power consumed by the card from the frames +12V rail.

Negative Watts Consumed

A read only indication of power consumed by the card from the frames +-7.5V rail.

Software Release Number

A read only indication of the software release number. A higher number is newer release of software.

Software Build Number

A read only indication of the software build number. Software build number is an internal indicator used by Sierra engineers to differentiate different software builds.

Factory Default Settings

The factory default settings are as follows

1) The audio mapping is for each AES input to be routed to its respective AES output, for example AES IN 1 to AES OUT 1.
2) Audio gain is set to 0dB and polarity is set to normal on all channels.

Remote Control

In This Chapter

This section provides a detailed explanation on using remote control functions with your card.

DashBoard Control System Software

The DashBoard Control System enables you to monitor and control openGear™ frames and controller cards from a computer. The DashBoard software and manual can be downloaded from the Sierra Video Systems website (www.sierravideo.com).

Using the Menus and Menu Descriptions

You must first install the DashBoard Control System software on your computer. Refer to the ***DashBoard Owner's Manual*** for software installation procedures and for using the DashBoard interface.

The following pages list the parameters from the menu tabs available in the DashBoard software when connected to a ADM-188.

Menu	Item	Format	Description
Card Info (Read-only)	Product	ADM-188	The product name
	Manufacturer	Sierra Video Systems	The manufacturer of the product
	Software Release Number	###	The release number of the firmware in this card
	Software Build Date	###	The internal build number of this software
	Software Build Time	###	The date and time the software was created
	+12 V Power Rail	#.## W	Positive Supply Power
	-7.5 Power Rail	#.## W	Negative Supply Power
	Video Input Standard	###########	Detected Video Standard on SDI or Analog Input
	Reference Standard	###########	Detected standard of selected reference.
	SSN	###########	Displays the Silicon Serial Number of the card.

Menu	Item	Format	Description
AES Audio Out 1/2 - 7/8	Source (per channel)	AES 1-16	Selects the source for the AES outputs. Each AES source can be chosen separately.
		Tone Generator 1-4	
		Silence	
	Gain (per channel)	Range (-400) - 400	Gain applied to AES audio output.
	Phase (per channel)	Normal	Inverts the phase of the AES audio output.
		Invert	

Menu	Item	Format	Description
Tone Generator	Tone Generator 1-4 Frequency	Range 50Hz –16KHz	Selects the frequency of the tone generated.

Menu	Item	Format	Description
Presets	Parameter Save	Confirm	Saves the parameters as preset.
	Parameter Load	Confirm	Loads parameters previously saved.
	Restart Parameters to Factory Default	Confirm	Will load factory presets and overwrite the save.

Technical Specifications

Category	Parameter	Specification
AES Audio Input	Standard	SMPTE 276M
	Number of Inputs	8 unbalanced
	Input Level	0.1 to 2.5V p-p (5V p-p tolerant)
	Input Impedance	75Ω
	Return Loss	> 12dB 100kHz to 6MHz
	Equalization	Automatic to 1000m with Belden 1694A (or equivalent) @ 48kHz AES signal
	Sample Rate	48KHz
AES Audio Output	Standard	SMPTE 276M
	Number of Outputs	8 unbalanced
	Output Impedance	75Ω
	Return Loss	> 30dB 100kHz to 6MHz
	Resolution	Up to 24-bit
	Sample Rate	48KHz
Reference Video Input	Number of Inputs	2 Terminating Frame Reference Inputs
	Standards Supported	HD: 720p 24/25/29.97/30/50/59.94 1080i 25/29.97 1080p 23.98/24/25/29.97/30 1080p/sF 23.98/24 SD: 486i 29.97 NTSC, 575i 25 PAL
	Signal Level	1Vp-p nominal
	Signal	Analog video sync (black burst or tri-level)
	Impedance	75Ω
	Return Loss	> 30dB to 30MHz
	Max DC on Ref Input	±1V
Other	Total Power Consumption	< 5W
	Warranty	Five Year Transferable

Specifications are subject to change without notice.

Service Information

In This Chapter

This chapter includes the following sections:

- Troubleshooting Checklist
- Warranty and Repair Policy

Troubleshooting Checklist

Routine maintenance to this openGear™ product is not required. In the event of problems with your card, the following basic troubleshooting checklist may help identify the source of the problem. If the module still does not appear to be working properly after checking all possible causes, please contact your openGear™ products distributor, or the Technical Support department at the numbers listed under the "Contact Us" section at the end of this manual.

1. **Visual Review —** Performing a quick visual check may reveal many problems, such as connectors not properly seated or loose cables. Check the module, the frame, and any associated peripheral equipment for signs of trouble.
2. **Power Check —** Check the power indicator LED on the distribution frame front panel for the presence of power. If the power LED is not illuminated, verify that the power cable is connected to a power source and that power is available at the power main. Confirm that the power supplies are fully seated in their slots. If the power LED is still not illuminated, replace the power supply with one that is verified to work.
3. **Reseat the Card in the Frame** — Eject the card and reinsert it in the frame.
4. **Check Control Settings —** Refer to the Installation and Operation sections of the manual and verify all user-adjustable component settings.
5. **Input Signal Status —** Verify that source equipment is operating correctly and that a valid signal is being supplied.
6. **Output Signal Path —** Verify that destination equipment is operating correctly and receiving a valid signal.
7. **Module Exchange** — Exchanging a suspect module with a module that is known to be working correctly is an efficient method for localizing problems to individual modules.

Sierra openGear Warranty

A. General

Buyer assumes all responsibility for ascertaining the suitability of Sierra Video Systems (hereinafter "SVS") products for Buyer's intended use. No product sold by SVS is designed or manufactured for use in any manner or under any conditions other than those described in SVS's instruction manuals and other printed material for each particular product. If any product is used or applied in a manner or under conditions not specifically authorized by such written materials or if any product is used by unqualified or improperly trained personnel, Buyer agrees that SVS shall have no liability of any kind arising from such use, and Buyer agrees to indemnify and hold SVS harmless from any claims of third parties arising from such use, and Buyer shall provide SVS with counsel of SVS's choice to defend against such claims.

B. Limited Warranty

1. This warranty applies only to the original purchaser and is non-transferable. This warranty begins on the date of purchase and will be in effect for five (5) years for new equipment or and for three (3) years for "Factory Refurbished" equipment. Buyer must obtain a Return Material Authorization ("RMA") number from SVS prior to returning a product for repair. If, in SVS' sole discretion, the product is found to be defective during the term of this warranty, SVS will at its option: (a) provide free replacement parts, and/or (b) repair the unit at an SVS facility. During the warranty period, SVS will make every reasonable effort to support critical emergencies by supplying no-cost loan equipment while the defective unit is being repaired. SVS will provide replacement parts and/or factory service at no charge. Buyer bears the cost of shipping products returned to SVS under this warranty. SVS will bear the cost of shipping repaired products or replacement parts to the Buyer.

This limited warranty shall not apply to any of SVS's goods which have been altered or which shall have been subjected to misuse, mishandling, improper storage or negligence. The aforementioned provisions do not extend the original warranty period of any goods which have been replaced by SVS. This limited warranty shall not apply to any goods not of SVS's manufacture, Buyer to be entitled only to the warranty set forth in the original manufacturer's limited warranty.

THIS LIMITED WARRANTY IS EXPRESSED IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE, AND ALL OTHER OBLIGATIONS OR LIABILITIES ON SVS'S PART.

SVS neither assumes nor authorizes any other person to assume for SVS any other liabilities in connection with the sale of products of its own manufacture.

2. SVS's liability hereunder on any claim of any kind, except as set forth herein for any loss, injury to person or property or damage, shall in no case exceed the price allocable to the goods which give rise to such claim.

3. In no event shall SVS be liable for any damages or injuries to person or property if any goods do not meet the above limited warranty, including, without limitation, incidental expenses or consequential or special damages, except as set forth in such limited warranty. The foregoing states the exclusive remedy of Buyer and the exclusive liability of SVS for any breach of the foregoing limited warranty.

C. Cancellation

Except as provided in paragraph B immediately above, all sales are final, and Buyer may cancel this order or return products only upon written consent of SVS.

D. General

A. In the event of a breach of any of the terms hereof, the non-breaching party shall be entitled to recover all of its costs, fees, and expenses, including, without limitation, reasonable attorney's fees, from the breach party incurred as a result of such breach, regardless of whether or not a suit is actually filed to enforce the terms hereof.

B. The provision hereof shall be governed by the laws of the State of California (excluding its choice of law provisions).

C. The headings are for convenience only and do not limit or amplify the terms and provisions hereof.

D. In case any one or more of the provisions set forth herein shall be held to be invalid, illegal, or unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions contained herein shall not in any way be affected or impaired thereby.

E. No waiver, alteration, or modification of any of the provisions hereof shall be binding unless in writing and signed by an authorized Officer of SVS.

NOTE:

All products returned to SVS for service must have prior approval. Return authorization requests may be obtained from your SVS dealer.

Ordering Information

ADM-188 and Related Products

Your **ADM-188 AES Audio Delay** is a part of the openGear™ family of products. Sierra Video Systems offers a full line of openGear™ terminal equipment including distribution, conversion, monitoring, synchronizers, encoders, decoders, embedders, and de-embedders, as well as analog audio and video products.

Standard Equipment

- **ADM-188** AES Audio Delay
- **ADM-188-OM** AES Audio Delay Owner's Manual

Optional Equipment

- **ADM-188-OM** AES Audio Delay Owner's Manual (additional Owner's Manual)
- **RM-ADM-188-B** openGear™ Rear Module compatible with ADM-188 (10 BNC)
- **RM-ADM-188-C** openGear™ Rear Module compatible with ADM-188 (16 BNC connector)
- **8310-C** Digital Products Frame and Power Supply with Cooling Fans (2RU, holds 10 cards)
- **8310-C-BNC** Digital Products Frame and Power Supply with fixed 100-BNC Rear Module and Cooling Fans. (2RU, holds 10 cards)
- **MFC-8310-N** Network Controller Card (Additional)

Contact Us

Contact Sierra Video Systems

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Visit us at the Sierra Video Systems website.

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